Washington M.T.	α	δ
July 25·371990	242° 4′ 4″·5	−37° 15′ 32″·0
Aug. 24·124442	267 10 42·3	−35 15 30·4
Sept. 23·339919	297 55 9·3	−26 49 50·6

From these positions I obtain by the usual methods the following system of elliptic elements :—

Epoch	1884, Sept. 24·5 Wash. M.T.	
M	7° 13′ 19″·52	Mean Equinox of 1884·0.
ω	300 57 44·43	
☊	5 11 23·56	
i	5 27 18·94	
φ	35 37 2·50	
log *q*	0·1069968	
log *a*	0·4862043	
log μ	2·8207001	
P	1958·41 days.	

The residuals for the middle place are zero, and for the following dates the difference between the computed and observed places is as small as can be expected, considering the great difficulty in observing accurately so faint an object :—

Wash. M.T.	*d*λ cos β.	C−O. *d*β.	log. Δ.
1884, Aug. 12·361652	+ 6″·52	− 3″·21	9·65375
Sept. 15·408454	+ 9·85	− 8·09	9·74018
Oct. 11·318804	+30·91	−10·62	9·86241
14·365442	+21·56	+15·71	9·87849

Observations of Comet Barnard, 1884. By John Tebbutt.

The telegram announcing this comet was received from the Melbourne Observatory on July 23, and the comet itself was found on the following evening. Throughout the whole period of observation the comet was excessively faint, and on August 22 was seen with the greatest difficulty. I have made the accompanying observations with the square bar-micrometer on the $4\frac{1}{2}$-in. Equatorial, the whole series being carefully corrected for defective orientation of the micrometer and for proper motion. The refraction corrections, owing to the great altitude at which the comet was observed, are insensible. In those cases where the comparison stars were found in Stone's *Cape Catalogue*, the precessions and secular variations of that catalogue were employed in bringing up the star's mean places to 1884·0. In all other cases the precessions have been calculated for the mean epochs by means of Peter's elements.

Apparent Places of Comet Barnard, 1884.

Windsor M. T.				R.A.			Log $\frac{p}{P}$.	N.P.D.			Log $\frac{q}{P}$	No. of Comps.	Comp. Star.
d	h	m	s	h	m	s		°	′	″			
July 24	9	38	34	16	4	41·06	+8·4868	127	14	23·7	−8·1770	4	1
24	9	38	34	16	4	41·10	+8·4868	127	14	26·3	−8·1770	4	2
27	14	24	36	16	12	9·41	+8·8388	127	15	21·3	+9·7125	3	3
27	14	24	36	16	12	8·99	+8·8388	127	15	18·8	+9·7125	3	4
28	9	13	27	16	14	6·42	+8·4054	127	15	36·5	−8 5057	10	4
28	10	40	7	16	14	15·43	+8 6782	127	15	25·2	+8·8403	5	3
28	10	40	7	16	14	15·43	+8·6782	127	15	27·4	+8 8403	5	4
31	9	41	34	16	22	9·77	+8·5342	127	14	24·5	−7·2041	7	3
31	9	41	34	16	22	9·67	+8·5342	127	14	25·8	−7·2041	7	4
31	9	41	34	16	22	9·03	+8·5342					7	5
31	9	41	34	16	22	9·51	+8·5342	127	14	24·9	−7·2041	7	6
Aug. 2	9	8	57	*	+2	2·83	+8·4123	*	+12	42·3	−8·4768	6	7
2	9	8	57	*	+1	49·13	+8·4123	*	+ 4	27·5	−8·4768	6	8
2	9	8	57	*	−1	24·31	+8·4123	*	+18	23·8	−8·4768	6	9
2	9	8	57	16	27	48·54	+8·4123	127	12	34·0	−8·4768	6	10
2	9	8	57	16	27	48·29	+8·4123	127	12	34·5	−8·4768	6	11
4	8	40	9	*	+4	33·37	+8·2563	*	+15	37·8	−8 6801	3	9
4	8	40	9	16	33	46·12	+8·2563	127	9	48·9	−8·6801	3	10
6	10	26	23	16	40	16 59	+8·6683	127	5	37·4	+8·8140	7	10
6	10	26	23	16	40	16·87	+8·6683	127	5	35·4	+8·8140	7	12
6	10	26	23	*	−0	37 33	+8·6683	*	+ 3	10·1	+8·8140	7	13
6	10	26	23	16	40	16·78	+8·6683	127	5	34·3	+8·8140	7	14
8	9	29	56	*	+5	50·56	+8·5167	*	− 2	6·6	−7·4478	10	13
8	9	29	56	16	46	44·46	+8·5167	127	0	17 0	−7·4478	10	14
8	9	29	56	16	46	44·35	+8·5167	127	0	21 0	−7·4478	10	15
9	9	13	4	16	50	5·63	+8·4532	126	57	8 6	−8 2477	7	16
9	9	13	4	16	50	5·23	+8·4532	126	57	8·5	−8·2477	7	17
10	8	26	9	16	53	25·60	+8·1767	126	53	51·8	−8·6862	2	16
10	8	26	9	16	53	25·28	+8·1767	126	53	52·6	−8·6862	2	17
11	8	34	13	16	56	57·63	+8·2434	126	50	0·6	−8·6347	2	17
11	9	15	13	16	57	3·82	+8·4652	126	49	39·0	−8·1093	12	16
12	8	41	31	17	0	33 76	+8·2951	126	45	40·2	−8·5730	6	16
13	9	36	37	17	4	18·66	+8·5447	126	40	35·4	+8·0738	6	17
14	8	56	17	17	7	54·60	+8·3817	126	35	43·2	−8·3816	4	18
14	9	5	13	17	7	55·56	+8·4248	126	35	38·5	−8·2294	3	19
16	10	4	27	17	15	35·12	+8·6236	126	23	42·0	+8·7040	10	19
16	10	4	27	17	15	35·37	+8·6236	126	23	42·2	+8·7040	10	18
18	9	6	0	17	23	8·18	+8·4286	126	10	38·5	−7·9525	10	19
22	10	6	32	17	39	12·28	+8·6246	125	37	39·3	+8·8118	12	20
22	10	6	32	17	39	12·01	+8·6246	125	37	41·4	+8·8118	12	21

Adopted Mean Places of the Comparison Stars for 1884·0, *with the Reductions to the Apparent Places for the Dates of Observation.*

Star.	R.A.	Reduction.	N.P.D.	Reduction.	Authorities.
	h m s		° ′ ″		
1	15 56 57·72	+3″·80	127 32 16·4	+ 6″·5	Wash. Mural Cir. Zone 24, 16; Wash. Cat. 1860, 6623; Cape Cat. 1880, 8727.
2	15 57 2·14	+3·80	127 29 40·9	+ 6·4	Wash. Mural Cir. Zone 24, 17; Wash. Cat. 1860, 6624; Cape Cat. 1880, 8730.
3	16 10 2·58	+3·84	127 27 45·1	+ 5·2	Wash. Mural Cir. Zone, 24, 18.
4	16 16 47·65	+3·87	127 17 36·8	+ 4·5	Wash. Mural Cir. Zone 24, 19; Wash. Cat. 1860, 6768; Cape Cat. 1880, 8913.
4	16 16 47·65	+3·86	127 17 36·8	+ 4·6	Ditto. ditto.
3	16 10 2·58	+3·83	127 27 45·1	+ 5·3	Wash. Mural Cir. Zone, 24, 18.
4	16 16 47·65	+3·86	127 17 36·8	+ 4·6	Wash. Mural Cir. Zone 24, 19; Wash. Cat. 1860, 6768; Cape Cat. 1880, 8913.
3	16 10 2·58	+3·78	127 27 45·1	+ 5·4	Wash. Mural Cir. Zone, 24, 18.
4	16 16 47 65	+3·81	127 17 36·8	+ 4·7	Wash. Mural Cir. Zone 24, 19; Wash. Cat. 1860, 6768; Cape Cat. 1880, 8913.
5	16 15 24·88	+3·80			Cape Cat. 1880, 8897.
6	16 19 42·39	+3·83	127 12 39·2	+ 4·4	Anonymous = 9 mag. Equatorial comparisons.
7	16 25 41·9	+3·82	126 59 49	+ 3·8	,, = 8 mag. ,, ,,
8	16 25 55·9	+3·83	127 8 3	+ 3·8	,, = 7½ mag. ,, ,,
9	16 29 8·8	+3·84	126 54 8	+ 3·4	,, = 8½ mag. ,, ,,
10	16 31 19·43	+3·86	126 58 56·7	+ 3·2	Wash. Cat. 1860, 6851; Cape Cat. 1880, 9019.
11	16 33 0·68	+3·86	126 55 27·7	+ 3·0	,, 1860, 6864; ,, 1880, 9046.
9	16 29 8·8	+3·81	126 54 8	+ 3·5	Anonymous = 8½ mag. Equatorial comparisons.
10	16 31 19·43	+3·83	126 58 56·7	+ 3·3	Wash. Cat. 1860, 6851; Cape Cat. 1880, 9019.
10	16 31 19·43	+3·79	126 58 56·7	+ 3·3	Ditto. ditto.
12	16 34 50·59	+3·82	127 6 55·4	+ 3·9	Cape Cat. 1880, 9061.

Star.	R.A.	Reduction.	N.P.D.	Reduction.	Authorities.
	h m s	″	° ′ ″	″	
13	16 40 50·2	+3·85	127 2 24	+ 2·4	Anonymous = 8 mag. Equatorial comparisons.
14	16 43 10·93	+3·88	127 18 43·2	+ 2·3	Wash. Cat. 1860, 6943; Cape Cat. 1880, 9128.
13	16 40 50·2	+3·82	127 2 24	+ 2·5	Anonymous = 8 mag. Equatorial comparisons.
14	16 43 10·93	+3·84	127 18 43·2	+ 2·3	Wash. Cat. 1860, 6943; Cape Cat. 1880, 9128.
15	16 48 20·77	+3·86	126 59 54·5	+ 1·8	,, 1860, 6997.
16	16 58 29·89	+3·90	127 3 58·2	+ 0·8	,, 1860, 7082; Cape Cat. 1880, 9295,
17	16 58 32·80	+3·89	126 56 16·8	+ 0·8	,, 1860, 7083.
16	16 58 29·89	+3·88	127 3 58·2	+ 0·8	,, 1860, 7082; Cape Cat. 1880, 9295.
17	16 58 32·80	+3·88	126 56 16·8	+ 0·8	,, 1860, 7083.
17	16 58 32·80	+3·86	126 56 16·8	+ 0·9	,, 1860, 7083.
16	16 58 29·89	+3·87	127 3 58·2	+ 0·9	,, 1860, 7082; Cape Cat. 1880, 9295.
16	16 58 29·89	+3·85	127 3 58·2	+ 0·9	,, 1860, 7082; ,, 1880, 9295.
17	16 58 32·80	+3·83	126 56 16·8	+ 0·9	,, 1860, 7083.
18	17 21 5·19	+3·92	126 40 46·8	− 1·3	Wash. Mural Cir. Zone 16, 58; Cape Cat. 1880, 9518.
19	17 19 57·61	+3·91	126 25 24·5	− 1·3	,, ,, 16, 57.
19	17 19 57·61	+3·87	126 25 24·5	− 1·2	,, ,, 16, 57.
18	17 21 5·19	+3·88	126 40 46·8	− 1·2	,, ,, 16, 58; Cape Cat. 1880, 9518.
19	17 19 57·61	+3·83	126 25 24·5	− 1·1	,, ,, 16, 57.
20	17 40 26·85	+3·84	125 51 1·0	− 3·1	Wash. Merid. Trans. Zone 44, 15; Wash. Cat. 1860, 7403; Cape Cat. 1880, 9681.
21	17 45 10·03	+3·85	125 35 30·6	− 3·6	Wash. Merid. Trans. Zone 44, 20; Wash. Obs. 1873, 476; Wash. Obs. 1874, 343; Cape Cat. 1880, 9734.

Private Observatory,
Windsor, N.S. Wales:
1884, *Sept.* 10.

Approximate Elliptic Elements of Comet 1884 (*Barnard*).

By W. H. Finlay, B.A.

I computed a parabolic orbit for this comet in August, but was unable to represent the middle place satisfactorily. As a similar result was found in Europe, and as M. Stechert's ephemeris in *Astr. Nach.*, No. 2609, showed large discordances from my later observations, I have computed elliptic elements with the following result. The observations used, viz. July 27, August 22, and September 17, were corrected for parallax from the parabolic orbit. The approximations to Q were not carried as far as perhaps they should have been, but the approximation was quite close enough to show whether the comet was moving in an ellipse, and if so, to give a very fair value of the periodic time.

τ	...	...	August $16^{d}\cdot50950$ G.M.T.
π	...	...	$306^{\circ}\ 3'\ 40''$
Ω	...	...	$4\ 54\ 1$
ι	...	...	$5\ 30\ 36$
log. a	...	...	0·5017524
ϕ	...	...	$36\ 34\ 31$
μ	...	...	$627''\cdot159$
Period	...	...	5·6615 years

Mean Equinox and Elliptic 1884·0.

These elements leave a discordance $c-o$ in the middle place of $-8''$ *in longitude and* $-1''$ *in latitude.* The month of October, since the Moon drew away from the evening sky, has been completely clouded until last night, October 14, when I secured a fine comparison of the comet with Arg. Oeltz. 21151. This observation compared with the above elements gives the discordance $(c-o)$.

$$d\alpha \cos\delta = -5^{s}\cdot0$$

$$d\delta = -11''\cdot0$$

Royal Observatory,
Cape of Good Hope:
1884, *Oct.* 15.